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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,284	09/18/2003	Charles Leu		9037

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EXAMINER

CALEY, MICHAEL H

ART UNIT PAPER NUMBER

2871

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.P.

**Office Action Summary**

Application No.

10/666,284

Applicant(s)

LEU ET AL.

Examiner

Michael H. Caley

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>09182003</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Claim Objections*

Claims 7, 8, 10, and 14 are objected to because of the following informalities: Lack of antecedent basis and/or improper dependency.

Claims 7 and 8 are currently dependent from claim 4, however, incorporate “the scattering material” referenced from claim 5.

Claims 10 and 14 are currently dependent from claim 8, however, incorporate items referenced from claim 9 (for example “the diffusion board” of claim 9, “intensified diffusion section” of claim 14).

“The diffusion section” of claim 10 lacks antecedent basis regardless of intended dependency. More specific diffusion sections are introduced in claims 1 and 9 and the reference in claim 10 should explicitly reference one or more of them in accordance with 35 U.S.C. 112, 2<sup>nd</sup> Paragraph.

Claim 15 is objected to because of the following informalities: awkward and confusing wording.

Line 1 should either read “A liquid crystal display”, “A light guide”.

Line 3 should be amended to disclose “a plurality of diffusion plates” or the like to agree with line 4 and be more grammatically correct.

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-7, 9, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoyama et al. (U.S. Patent No. 5,899,552 "Yokoyama").**

Regarding claim 1, Yokoyama discloses a liquid crystal display with a light emitting flat surface, having:

a light guide having an emitting surface (Figure 6 element 15), and a pair of end surfaces (light incident surfaces facing fluorescent lamp 12); and

a pair of light sources (Figure 6 element 12) arranged to correspond with the pair of end surfaces;

wherein the light guide forms two diffusion sections (E1 and E2) creating a junction surface between diffusion sections.

Yokoyama fails to explicitly disclose the two diffusion sections E1 and E2 as having different refractive indices. Yokoyama, however, teaches an example of achieving different effective scattering irradiation parameters E1, E2, E3 by using materials having different refractive indices (Column 15 lines 55-60, Column 16 line 60 – Column 17 line 53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the two diffusion section to have different refractive indices. Yokoyama teaches such a method as a means of achieving different effective scattering parameters in adjoining blocks of the light guide (Figures 4A-4E; Figure 6 element 11). One would have been motivated to construct the light scattering blocks using materials of different refractive indices as proposed to achieve results as taught by Yokoyama, such as a backlight providing uniform and bright illumination (Column 4 line 64 – Column 5 line 2).

Regarding claim 2, Yokoyama discloses the light sources as linear light sources (Figure 6 element 12).

Regarding claim 3, Yokoyama discloses the junction surface (along back surface 16) formed in the light guide as parallel to the linear light sources (Figure 6).

Regarding claim 4, Yokoyama discloses the junction surface as positioned substantially equidistant from the two light sources (Figure 6).

Regarding claim 5, Yokoyama discloses the junction surface as formed in the light guide by injection molding two different mixtures of transparent materials and scattering material, the two different mixtures having different refractive indices (Column 6 lines 1-7).

Regarding claim 6, Yokoyama discloses the light guide as having a substrate made of highly transparent material (Column 6 lines 25-36, Column 15 lines 36-42).

Regarding claim 7, Yokoyama fails to expressly disclose the scattering material as formed by polymethyl methacrylate having a grain size ranging from 5 to 30 micrometers. Yokoyama, however, discloses a table of possible materials to be used as a particle material (Columns 16 and 17) including polymethyl methacrylate (PMMA) and a preferred range of particle sizes overlapping the proposed range.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the scattering material from the material and grain size as proposed. Yokoyama teaches such specifications for the particle as within conventional ranges for such an application. One would have been motivated to use the material and grain size as proposed as an engineering expediency to achieve the expected results of such a particle such as a particular scattering characteristic.

Regarding claim 9, Yokoyama discloses a liquid crystal display (Column 1 lines 1-34) having:

a diffusion board having an emitting surface (Figure 6 element 15) and an incident surface (facing light source 12); and

at least a light source (Figure 6 element 12) arranged behind the incident surface; wherein the diffusion board forms an ordinary diffusion section (Figure 6 element 11 area E2) and an intensified diffusion section (Figure 6 element 11 area E1; Column 14 lines

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54-59) which diffusion section has a refractive index and corresponds in shape and position to the shape and position of the light source (Figure 6 elements 11 and 12).

Yokoyama fails to explicitly disclose elimination of a “shadow” image of the light source when viewed from the liquid crystal display. Yokoyama, however, teaches the diffusion board as “capable of obtaining a uniform emitting light flux” (Column 5 lines 6-9).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the diffusion board disclosed by Yokoyama such that a shadow image of the light source is eliminated when viewed from the liquid crystal display. Yokoyama teaches an enhanced light scattering conducting element capable of uniformly emitting light. One would have been motivated to construct such a diffusion board to uniformly emit light without shadows so that the liquid crystal display may have uniform brightness and a more visually pleasing picture.

Regarding claim 15, Yokoyama discloses a liquid crystal display having:

a backlight module (Figure 6 elements 11, 12, 13, and 14) including a plurality of light source (12) emitting lights toward a plurality of diffusion plates (11 and 14), wherein

the diffusion plates define at least first and second types of regions thereof, of which the first type (11) faces the adjacent light source in a perpendicular manner while the second type (14) faces the adjacent light source in an oblique manner, under a

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condition that diffusion capability of the first type is better than that of the second type (Column 19 lines 22-47).

**Claims 8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoyama in view of Ariyoshi et al. (U.S. Patent Application Publication No. 2003/0072080 "Ariyoshi").**

Yokoyama fails to disclose the scattering material as formed as a melamine resin. Ariyoshi, however, teaches melamine-based fine particles as conventionally combined with a transparent medium of a different refractive index to form a light scattering sheet analogously to the device disclosed by Yamamoto.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the scattering material from the material and grain size as proposed. Yokoyama and Ariyoshi teach such specifications for the particle as within conventional ranges for such an application. One would have been motivated to use the material and grain size as proposed as an engineering expediency to achieve the expected results of such a particle such as a particular scattering characteristic.

Regarding claim 10, Yokoyama discloses the diffusion section as formed by providing scattering particulates having a different refractive index, thereby having a higher diffusion capability as compared to the rest of the diffusion board (Column 16 lines 40-50).



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Regarding claim 11, Yokoyama discloses a light enhancing plate to intensify the luminance emitted from the light guide (Figure 6 element 14).

Regarding claim 12, Yokoyama discloses the light sources as provided with a reflector (Figure 10 element 55).

**Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoyama in view of Ariyoshi and in further view of Tanaka et al. (U.S. Patent No. 5,550,657 “Tanaka”).**

Yokoyama as modified by Ariyoshi fails to disclose the reflector as further comprising a reflecting film to increase the light reflected therefrom. Tanaka, however, teaches such a reflecting film (Figure 3 elements 24A and 24B; Column 7 line 66 – Column 8 line 6) to improve the reflective efficiency of such reflectors to near 100%).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed reflecting films on the reflector as proposed. One would have been motivated to form such reflecting films to increase the efficiency of the light source and the brightness of the display.

**Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoyama in view of Ariyoshi and in further view of Lea et al. (U.S. Patent No. 6,456,437 “Lea”).**

Yokoyama as modified by Ariyoshi fails to disclose the intensified diffusion section as formed of fluorescent particulates. Lea, however, teaches a diffusion board such as suitable for

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backlighting a liquid crystal display in which fluorescent particles may be used (Column 1 lines 44-50, Column 8 lines 8-34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the scattering material from fluorescent particles as proposed. Lea teaches such specifications for the particle as within conventional ranges for such an application. One would have been motivated to use the material and grain size as proposed as an engineering expediency to achieve the expected results of such a particle such as a particular scattering characteristic.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (571) 272-2286. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael H. Caley  
March 3, 2005

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